APPLYING AUTOMATION IN SLOVAK TOURISM INDUSTRY – BENEFITS AND ISSUES

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Abstract: This research paper is devoted to analysis of the problematic aspects of tourism sector development in Slovak economy in terms of the robotics and automation issues being affected by Industry 4.0 concept implementation and find out their consequences. The main objective of the research is to estimate the impact of robotics, automation and digitalization within Slovak tourism business that might affect the new job creation and job disposal along with the labor force adaptability to it. The way how robotics is being implemented in hotel business, the particular example is to be illustrated on the Hotel Elizabeth in Trenčín, Slovakia by means of the structured interview as the principal scientific method, the hotel managers were inquired by. Further analysis is provided on a database of Eurostat, Ministry of Economy of Slovak Republic, UNWTO and OECD. The results have shown that automation and robotics of activities in hotel business can help tourism industry improve its performance also contribute to productivity.

Keywords: Slovak tourism sector, Industry 4.0, new technologies implementation, automatics, robotics, sustainable jobs creation, hotel business.

1 Introduction

Lipkova, Hovorkova (2018) and Saroch (2015) indicate that the development of information technology has changed the way people search, buy and consume products and services. Automation and digitization are currently experiencing their greatest boom. They change the functioning of not only industry and production, services, but also the whole society. Today, machines are able to produce a required product independently according to specified parameters, they recognize when they need to be fixed, to stop their operation when there is a danger ahead (Svarc, Grmelova, 2015; Tajtakova, Zak, Filo, 2019). Mura, Haviernikova, Machova (2017) and Zemanova, Drulakova (2016) assert that with the start of robotics and digitization, changes on labor market and possible increases in risks, such as increased unemployment linked to job cuts, are expected. In case of being fired, with no job currently, this period of unemployment can be overcome by the new modern trend, especially in the tourism sector - a shared economy. Logically, more jobs should be lost than those being created. Generally speaking, individual sectors being dependent on internet, artificial intelligence and new technologies are experiencing economic and social transformation. Saroch, Smejkal (2018) and Okreglicka, et al. (2017) concede that with the start of Industry 4.0, labor productivity will increase, but problems on labor market might emerge; the less-skilled workforce will become the most vulnerable.

This paper will draw attention to the employers' problems related to the insufficient number of labor force in tourism sector and hotel business, its possible replacement by automation and robotic technology will be analyzed. Specifically, it is all about the issue to explore the possibilities in what way the Industry 4.0 will influence the labor market in tourism sector in Slovakia and we will try to find out how these jobs being created within the Industry 4.0 implementation could be used in tourism sector. Therefore, the main goal of the research, presented in the presented paper, is to reveal and estimate the effect of automation and robotics implemented in Slovak tourism sector on Slovak economy and labor market. Within the stated objective the outline of the paper is as follows. Based on the literature review the issues of robotics implementation in Slovak tourism industry and automation and digitalization in tourism versus job creation/disposal in Slovak economy will be analyzed and followed by the discussion on the potential changes within the labor market in Slovak Republic due to robotics, automation and digitalization being implemented in tourism.

2 Theoretical Background and Literature Review

Many authors such as Krecková, Zadrazilová, Rezanková (2016), Sejkora, Sankot (2017), Machkova, Sato (2017) and Zagata, Lostak, Swain (2019) rank the following factors as benefits of Industry 4.0: higher competitiveness; cost minimization, low stock levels; economy efficiency, flexibility and production increase, personalized products; elimination of errors, wastage and delay; reduced production time, efficiency; variation in control; flexible responses to demand fluctuations; profitability, benefits of mass production; security-protected sensors and immediate response capability; renewable energy sources usage; process optimization; quality improvement; reducing waste; ability to intervene more quickly in case of production problems; paper documents digitization; better maintenance; real-time monitoring; better working conditions and sustainability; increased protection in case of accidents, rapid detection of dangerous substances; better communication and cooperation opportunities; focus on ergonomics and ecology; usage in building maintenance and facility management, etc.

In addition, Dudáš, Grančay (2019) and Bolotov, Tauser (2015) ponder that in a risky and highly hazardous work environment, Industry 4.0 has the potential to significantly improve the health and safety of workers, as well as the supply chain control. Authors such as Sadilek, Zadrazilova (2015) and Sauer, Hadrabova, Kreuz (2018) highlight the Industry risky factors being associated with terrorism, hacking attacks, IT security costs as well as data security issues have been significantly increased by the integration of new systems and bigger access to these systems. Hnat, Sankot (2019) and Saroch, Famfule (2016) point out on the problems of achieving and keeping a high degree of reliability and stability of communication - data security, protection of sensitive information and business secrets - protection against viruses and early detection of their penetration. Authors like Tupa, Vojtovic (2018) and Tauser, Zambersky, Cajka (2013) contend that, the risk within Industry 4.0 lies in the production process integrity due to less human control; the loss of high-paid jobs; systematic lack of experience and manpower to build and implement these systems; the necessary encryption, firewall protection, automatic scanning; prerequisite for spending increase in virtual reality and augmented reality; investments in education, research, development and infrastructure; investments to create a favorable business climate and so on.

According to Krajnakova, Jegelaviciute, Navickas (2018) and Miklosik, Kuchta, Zak (2018) the specific characteristics of tourism services often present a constraint or a problem that can be served as a stepping stone to enhance the value of a product through innovation. There can be identified three factors that determine the level and pace of tourism innovation. The first factor is presented by determinants related to supply or suppliers – the supply factors. Fojtíková (2018) and Jirankova (2012) argue that new technologies have led to the development of new capabilities, materials, new services and new forms of organizations. Cihelkova, et al. (2020), Kreckova, Odehnalova, Reardon (2012) and Jašková (2019) agree that this has been particularly true in the last two decades, where technological innovation has played a key role. In the field of tourism, technology has brought a new form of business called "e-tourism", which is today the most successful form of "e-commerce". This event created the need for new tourism management capabilities (e-marketing). New guest information services (e.g. databases) and new forms of network organization, in particular marketing cooperation, have emerged when using new technologies (Nevima, Tureckova, Varadzin, 2018; Cajka, Kral, Tauser, 2015; Daňo, Lesáková, 2018).

However, there were also changes on the demand side not only on the supply side. De Castro, Vlčková, Hnát (2017) and Mura, Kljucnikov (2018) ponder that social progress in the field of work, population pyramid, individualization and increased demand for quality have changed the behavior of tourists and people sparing their free time. The new lifestyle has been created by changing working hours, higher incomes, increasing leisure time and the value of holidays, being now considered an important part of life. Accuracy, responsibility, comfort / convenience, speed and price are the key drivers of quality service. The aesthetic aspect, personal attention and choice are secondary and are considered "added features". Anyway, they help create a special “value for money” for the customer (Miklosik, Evans, et al. 2019; Grmelova 2018a). Customer orientation plays an important role in service innovation. According to Hnat, Stuchlikova (2014) and Haviernikova, Klucka (2019) valuable information can be obtained from the behavior of a customer who is closely involved in the production of tourism services. Companies need to be prepared to adapt to changing interests and values of their guests. Helísek (2015) and Maitah, Smutka (2019) note that the most successful new products offer special and unique value, based on innovations that take into account the interests and needs of a client. Such innovations lead to bigger market share, increase efficiency and facilitate the achievement of objectives (turnover, profit).

As a third factor determining the level and rate of innovation in tourism is called competition. Many tourism sectors, including airlines, transport, hotel chains, tour operators, car renters, are highly concentrated and act as global players in the industry. Grmelova (2018b) and Sauer, Kolinsky, Prasek (2019) claim that as the market grows, further technological advances in information technologies can turn normal competition into distorting competition. Ivanová, Masárová (2018) and Krajnakova, Vojtovic (2017) agree that globalization and deregulation have led to further intensification of competition. As in other areas of economic activity that support process innovations (networking, reservation and revenue management systems, etc.) rather than product innovations, it is too easy to imitate a competitor.

According to Mura (2019) and Krnacova, Drabik (2018) the priority role of tourism satellite account indicator is not only to determine the share of tourism in gross domestic product, but also its compilation provides a number of other detailed information indicating the development of this sector. It allows a detailed analysis of tourism demand and supply and an assessment of the overall benefit for the country's economy. Authors such as Hanulakova, Dano, Drabik (2019) and Helisek (2018) are also convinced of the growing significance of tourism to world economy as well as the development of new jobs, ranking the tourism industry among the most important sectors in international economics. Many authors such as Miklosik, Kuchta, et al. (2019) and Jirankova, et al. (2015) argue that important indicators of tourism are mainly the impact on the balance of payments of a country, the development of employment, including the possibility of creating new jobs, as well as the positive impact on economic and social development of particular regions.

Harakaľova (2018) and Sejkora (2014) argue that the current world of tourism is characterized by globalization. An important accompanying factor of this globalization is the growth of tourist experience. Traveling at the end of the 20th century was stimulated by the growth of welfare, leisure and the use of vocation for several times in a year. According to Simionescu, Bilan, Streimikiene (2019) and Haviernikova, Ivanova (2018) today's tourist is more keen on traveling and much more experienced, but also more demanding on the quality and structure of the services provided. As a result of globalization and the industrial revolution of the 20th century, the requirements for the implementation of new and innovative products and regions have also increased in order to be able to compete on tourism market (Zagata, Hrabak, Lostak, 2020; Toth, Maitah, Maitah, 2019; Zemanova, 2015). Globalization is characterized by the emergence of multinational companies (airlines, hotel, restaurant, etc.), which have expanded their business beyond their national borders in order to "break through" on other world markets. This process is called internationalization. Authors such as Gärtner, Sadílek, Zadražilová (2017) and Hanulakova, Dano (2018) concur that the interconnection of air carriers and hotel companies has also made it possible to involve new destinations or regions in tourism, causing changes within the markets. Tourism in the world has to cope with certain developments related to the development of society and the economy. The needs and wishes of visitors are changing more and more (Zemanova, Drulakova, 2020; Fojtikova, Stanickova, 2017).

Authors such as Nenckova, Pecakova, Sauer (2020) and Cihelkova, Nguyen (2018) concur in the idea that the principles of sustainability apply to the environmental, economic and socio-cultural aspects of tourism development and an appropriate balance must be struck between the three dimensions in order to ensure their long-term sustainability:

- the optimal use of environmental resources, which are a key element in the development of tourism, adherence to basic ecological processes and assistance in the protection of natural heritage and biodiversity (Cernohlavkova, et al. 2013; Jirankova, Hnat, 2012);
- to respect the socio-cultural authenticity of host communities, protect their building up and living cultural heritage, traditional values and contribute to intercultural understanding and tolerance (Varadzin, 2016; Drabik, Zamecnik, 2016);
- to ensure effective long-term economic operations that provide socio-economic benefits to all stakeholders, are fairly distributed including stable employment and income opportunities, social services for host communities and are contributing to poverty reduction (Boukalova, Kolarova, Lostak, 2016).

Sustainable tourism development requires informed participation by all stakeholders as well as strong political awareness to ensure broad participation and consensus building. To achieve the sustainable tourism is a continuous process and requires constant monitoring of impacts and implementation of necessary preventive or corrective measures whenever necessary. Tourism should keep a high level of tourist satisfaction, ensure a meaningful experience for tourists, raise their awareness of sustainability and promote the sustainability described in the field of tourism (Lipkova, 2017; Sadilek, Zadrazilova, 2016; Lipkova, Gress, Poncarova, 2017).

3 The Goal and Research Methodology

The research task is focused on the analysis of the problematic aspects of tourism sector development in Slovak economy in terms of the robotics and automation issues affected by Industry 4.0 elements implementation and find out their consequences. The research will be focused on exploring the Slovak tourism industry analyses and the further development under the Industry 4.0 conditions.

To put in other words, the main goal of this paper is by means of analysis, comparative analysis methods followed by logical deduction to figure out the potential benefits for Slovak national economy development coming out of Industry 4.0 aspects being implemented in Slovak tourism sector. The paper is focused on problematic aspect analyses such as the current status of Slovak tourism environment and possibilities to implement Industry 4.0 technologies like robotics and communication and information technologies into Slovak tourism and hotel industry. The issue is to figure out whether and to what measure the robotics, new technologies might affect the new job creation along with the labor force adaptability to it. For the most objective assessment of the changes being awaited by Slovak tourism industry and hotel business due to the implementation of Industry 4.0, the structured interview method has been chosen as the basic research method the hotel managers were approached by. The way how robotics is being implemented in hotel business, the

particular example is to be illustrated on the Hotel Elizabeth in Trenčín, Slovakia by means of the structured interview as the principal scientific method, the hotel managers were inquired by.

To accomplish this goal, methods such as analysis, comparison, synthesis and logical deduction are to be used. Subsequently the analysis will lead to synthesis and prognosis by means of abstraction method eliminating the less important factors in order to set general statements and opinions. Data and for the analysis are withdrawn from the respected and reliable institutions such as EUROSTAT, Hotels and Restaurants Association of Slovak Republic (ZHR SR), Ministry of Economy of Slovak Republic, Slovak Statistical Office, ILO - International Labor Organization and IATA - International Air Transport Association. Annually published reports on competitiveness by organizations such as the UNWTO and OECD have achieved high recognition from the governments of countries being evaluated as well as businesses, and therefore they are considered as authoritative sources in this field.

4 Results and Findings

This section is devoted to the analysis of issues regarding the robotics implementation in Slovak tourism industry and automation as well as the digitalization in tourism versus new jobs creation and declining jobs disposal in Slovak economy.

4.1 Robotics implementation in Slovak tourism industry

One of the Trenčín hotels has recently "employed" the first robot in Slovakia. It works at the reception as the first robot on a Slovak hotel scene. Artificial, shiny white humanoid helps guests at the Elizabeth Hotel in Trenčín with orientation. The Heritage Hotels of Europe hotel organization, the Hotel Elizabeth in Trenčín belongs to, does not want to release people in the future, but robots should relieve hotel staff from routine administration. The robot is one-meter-high, weighs 28 kilograms and is called Marko. The robot with a display on its chest moves its head, shoulders, elbows, wrist, five fingers and knee and is currently tirelessly skating around the reception in Elizabeth Hotel in Trenčín. It is not as fast as the staff is, is able to move by three kilometers per hour, but it still helps employees. The Marko robot is social and constantly acquainted with new things and is learning other skills. Its task is to advise guests with minor questions. Guests can get a piece of advice on how to navigate within the hotel, it offers tourist advice and information about the location or services of the hotel. The Robot speaks English but learns Slovak and even dances when necessary. In the future the robot should also be able to accommodate guests. According to the Elizabeth Hotel manager, the robot speaks English, it should be able to speak Slovak and other languages by the half of the year of 2021; in addition, it is incorporated by four microphones, two HD cameras, a 3D sensor, touch sensors especially on hands and feet and three buffer sensors. Heritage Hotels of Europe chain is one of the leading innovators in hotel business. Since January 2019, it has been receiving bitcoins in all its facilities and is also preparing for opening the doors by cellphones instead of cardkeys. Charging stations for electric cars are being built by the hotels. About half a milliard EUR will be invested into the improvement of rooms interior, technology, but also staff training. Soon guests will be able to open rooms not using keys but smart phones.

The international hotel chain Heritage Hotels of Europe will deploy the recently introduced robot to all its hotels in Hungary, Austria, Italy, Croatia, Slovenia. The Elizabeth Trencin Hotel in Slovakia was the first within this chain where the robot was implemented. In addition to consulting the services to guests, the robot will hand over the mobile key to guests to open their room. When a group of tourists from abroad passes by, the robot turns their head towards them, gestures with a hand, and calls "Be my friend" for a conversation and will be also entrusted with the check-in service area. The robot was made in France and is supported by Adastra Inc. It does not know how to learn; it is necessary to program it. Any robot cannot replace human empathy and emotions. Today, however, hotel staff does a lot of transactional tasks that can be replaced by artificial intelligence. The robot can save time for staff on guests to be able to provide a more personalized experience. According to the director of Elizabeth Hotel in Trencin, for the hospitality segment robots will present a similar revolution to the Internet as some 20 years ago when the first website was created. Meanwhile, the robot Marko is able to give an advice on restaurants in the city or hotel services and some of the guests take it as an element of amusement; they take selfie; have jokes or dance with it.

4.2 Automation and digitalization in tourism versus job creation/disposal in Slovak economy

An example how automation and digitalization can make work more effective the trivago.com platform could be picked up, which provides the accommodation facilities of several companies, among which the client can choose the product according to his/her preferences. As more and more people book their trips online, companies need to adapt to this new reservation systems opportunities. Otherwise, for instance a hotel might not have reached its targets for the number of services or airline sold the desired number of flight tickets. It is obvious that different target groups prefer different ways to book a trip. For consumers, there are currently different ways of booking a hotel, while before digitization there was only one option: travel through travel agencies or travel companies. Online guides offer several benefits: simple updates, links to specific information, searching features, feedback or reviews from other travelers. Through virtual reality, clients can walk through and see how the famous places like Athens, Rome, or the pyramid of Giza looked like in the past, experience the most famous battles in history, while also making the lesser-known historical places on earth more attractive than those people don't visit as often as the most famous ones. As it can be seen, all this would be new and very attractive for potential visitors - it would contribute to the increase in the number of visitors in these well-known and less well-known regions, which would lead to the need to increase the number of new tourism facilities, also new accommodation facilities, catering facilities, quality infrastructure in the regions would have to be built. Undoubtedly, for these facilities to be operational and able to provide their services, it will be necessary to create new jobs for the staff, cooks, receptionists, guides to the sites and others. At the same time, there will be a need for a new workforce on construction sites, whether hotels, restaurants, new roads (OECD, 2020; IATA, 2020).

The International Labor Organization (ILO) supports the promotion of sustainable and socially responsible tourism and the creation of decent jobs in tourism through: strengthening the links of tourism with related sectors in its supply chain (e.g. agriculture, crafts, transport, infrastructure, construction) along with integrated approach and support for local resources. It can be done by enforcing initiatives to promote job creation at the local level, including in rural areas that contribute to social and economic development and by reducing poverty through social inclusion, regional integration and the expansion of local incomes as well as by investing in the development of skills and vocational education and training and improving working conditions to improve the quality of services in this sector (ILO, 2020).

In fact, no other sector provides employment to such a large part of society. Of particular interest are the types of people who work in these functions. Tourism is usually used by a higher proportion of women. According to the data from UNWTO (2020) and Eurostat (2020) for example, women work in 65% of travel and tourism jobs in Australia and Germany, compared to 45% in other sectors in these countries. Tourism tends to employ young people. About half of all employees in hotels, catering and hospitality are under 25 years old. This is particularly important for an economy in less developed countries where the proportion of young people is much higher. Tourism also provides employment opportunities for people with lower or non-professional education. By its nature, the tourism industry is often labor-intensive because it needs a large number of people

to operate rooms, prepare food and maintain a hotel infrastructure. These are jobs that should be relatively safe from the advancement of technology and artificial intelligence.

Besides the implementation of robotics, automation and digitalization also the demand side of the economy has to be reflected to avoid the negative effects on labor market within the tourism sector. According to the Ministry of Economy of Slovak Republic (2020), the reason for the growth of the whole area of services related to domestic tourism in Slovakia is the implementation of a contribution benefit for employees, which will increase the performance of tourism industry. These are so-called recreational vouchers, which give the employee the opportunity to ask the employer for a recreation allowance. The contribution will be 55 percent of the eligible costs, up to a maximum of EUR 275 per year. This means that if an employee spends EUR 500 or more per year on recreation, the employer will contribute a maximum of EUR 275. If the employee spends a lower amount of recreation, the employer will provide him with an allowance of 55 percent of the eligible expenses. Only companies with more than 49 employees will be obliged to provide this recreation allowance to employees. Only a person who has worked in the company for at least 24 months will be entitled to it. For other employers with 49 employees or less, the option to provide a recreational voucher will be optional. Upon the fact that this recreational voucher can only be used within the Slovak Republic, it is very likely that this will have a positive impact on the contribution of tourism to national economy and employment. Therefore, tourism will be a decisive player in recruiting people who can no longer find employment in industrial sectors.

According to Hotels and Restaurants Association of Slovak Republic - ZHR SR (2020) accommodation and catering services can absorb a huge amount of workforce due to its cross-sectoral nature and influences from other sectors. Reinforcing the employment base in tourism sector was certainly also affected by increased production in other industry sectors within the Slovak economy, which brought additional disposable income to bank accounts of inhabitants, which they could spend on recreation and thus further boost consumption in spa, wellness and other sectors of tourism. Due to the increased number of visitors to accommodation facilities, being according to Eurostat (2020) already 3 774 062 in 2014 and 5 375 475 in 2019, wages and employment motivation increased, resulting in an increasing number of employees in tourism sector. It is assumed that the performance of accommodation and catering facilities will continue to increase and so tourism will continue to absorb labor that will not find its place in primary and secondary economic sectors.

The findings have revealed that accommodation and catering activities employ a significantly higher number of people each year in Slovak Republic; more than ten percent, or more than seven, is definitely not a negligible figure. It is clear that a part of the workforce from the manufacturing industries, being no longer to be employed due to the mechanization, was transferred into the tourism sector, where additional added value in the production of recreational services is created. This issue is also reflected by a minimum increase in employment in industry, by only 1.9% on year-on-year bases. Another evidence is the gradual increase of average wages in tourism sector, which, although not nearly the same as in industry sectors, have increased by almost 20% during the period of 2014 and 2019 (Slovak Statistical Office, 2020). Even though wages are still at a relatively low level in tourism sector, it is assumed that they will be increased proportionately at the same rate of economic growth.

5 Discussion

When it comes to the potential changes within the labor market in Slovak Republic due to robotics in tourism, the labor market in the field of tourism is very closely related to the human factor. Direct contact with employees in tourism industry is very common. Even though digitization and robotics may be seemed to affect this area only partially, it will not affect labor market changes in this area so much. As mentioned above, the concept of Industry 4.0 extends beyond the manufacturing area. These areas are most often mentioned. Only very few people realize that there is also a slow change in tourism. It is obvious that the area of accommodation facilities is a specific area of tourism, as it is the area from which the essence of travel is based. The impact of Industry 4.0 on accommodation, namely the hotel business and jobs in such establishments, is an area that is also affected by robotics and digitization. Suffice it to say that in Slovakia we do not see such big changes in this area of tourism as in Japan, where there are already hotels without employees. Hotel services are characterized by personal approach of staff. Some hotel clients explicitly want accommodation, where they will be taken care of, and staff will notice them. In hotel business, in some period of time there will be some changes under the influence of Industrial Revolution 4.0, but personal contact as a whole will never be erased and, if so, probably only in large hotels. However, there are always individuals who specialize in personal contact with the customer.

It is evident that within large hotels there is more diversification of jobs than in smaller ones. This means they have their own booking department, sales department, marketing department, many people at the front desk. Each block has its own manager, and of course there is a hotel manager. Management as an important work control area is one area that doesn´t need to be afraid of being replaced by robotics. Also, automation is not expected in sales or personnel departments as these job positions require qualified and skilled staff. Human resources managers are not in danger of being replaced by robots. However, ordinary employees can be easily replaced. The impact of Industry 4.0 on hotel executives may be an increase in knowledge and knowledge requirements in the field of information technology. Chambermaids appear to be a specific kind of job in terms of accommodation services. If a guest does not meet them in hotel corridor, they do not come into direct contact with the guests, even though the share of this job on hotel operation is very high and substantial (ILO, 2020; OECD, 2020; IATA, 2020). Nowadays it can be seen the trend of so-called robotic vacuum cleaners, that can vacuum the room where they orient themselves by means of sensors. There are companies, that have already developed robots to replace the classic housekeepers. This robot can vacuum, wash, clean up hotel corridors, and is used in airports as well as hotels. Generally speaking, we can say that we do not have to expect a complete dissolution of such a job yet, but over some time it would be possible.

Undoubtedly, the area of catering services is characterized by a strong personal relationship with the customer and therefore it is not assumed that automation could dominate in restaurants, bars and thus replace human labor. Kitchen workers also have a very important position. Despite all these preconditions, it is precisely them who may be threatened and being replaced by artificial intelligence. Nowadays, the use of robotic helpers in restaurants is increasing. This will facilitate a part of the production process. For example, automated machines can completely prepare pizza. Since 2013, there are the first pizza machines that can create pizza in 3 minutes. In Slovakia, such vending machines can be found in shopping malls in Bratislava. This kind of automation and robotics is suitable for fast-food types of restaurants and pizzerias (ZH SR, 2020). We can notice that Industry 4.0 can significantly affect the number of jobs in restaurants. This concerns rather the fast food restaurants, where the emphasis is on speed and not on comfort. For classic restaurants and especially luxury restaurants, we can assume that a personal contact will always come first. Only the jobs like cook assistant may be at risk where automation could help cooks, for example, in preparation of vegetables. Currently, in the field of catering a big variety of smart technologies is in usage. These are, for example, Bluetooth sensors that allow automatic temperature adjustment for food. This technology, which keeps the necessary temperature for particular food and significantly reduces the possibility that the food will go wrong. Furthermore, more and more tablets are used as menus; by means of tablet we can order

food, by mobile applications we can make reservations in restaurants from home, and so on.

It can be assumed that the synergy of tourism industry in Slovak Republic along with the modernization of manufacturing industry within the new jobs creation lies mainly in the creation of higher added value issue, which will have a positive impact on the level of disposable income. For citizens, higher incomes and more money will mean that they will be able to afford even more luxurious goods and services for which they could not spend enough money before. Among these goods and services, we can also include tourism, which, like automated production, belongs to knowledge-intensive production with high added value. Increased demand for accommodation and catering services is expected after the improvement of financial situation of Slovaks, which will lead to the creation of new jobs. If we include the multiplier effect of tourism industry and its cross-sectional nature, which helps to further increase consumption and therefore also production, we get further and further additional growth in disposable income. In this way, the synergy effect will be met when the final effect is higher due to the merger of two sectors, which on its own could produce a certain value, but together they multiply and valorize these phenomena in the long term.

To put it in other words, the synergies of the two sectors, when fully involved, will be rapidly proved at several levels. One of them is balancing and reducing regional disparities by creating new jobs of higher local GDP. As the least developed districts in Slovakia having the biggest natural environment potential are chronically known for their underdeveloped infrastructure, which discourages industrial investors from entering the regions, they cannot rely on production to reduce unemployment. But what they can do, for example, is to facilitate the emergence of tourism facilities that are not so much dependent on infrastructure and thus employ their own inhabitants. In developed Slovak regions with industry and were incomes are accumulated, the demand for recreation and discovering new experiences beyond the main destinations will be met. As consumption increases with increased supply, combined with sufficient incomes, the effect on economic growth in the least developed regions would increase at an exponential rate in this case.

6 Conclusion and Further Directions

Considering the research results, it can be concluded that the benefit of digitization is also to make passengers aware of new destinations less known in the past. In these destinations, national economies can grow, new jobs can be created, which can effectively reduce, for example, unemployment in developing countries and thus increase the socio-economic development of world economy on a global scale. Finally, we can summarize that automation and robotics of activities in hotel business can help tourism industry improve performance by reducing errors and improving quality and speed, and in some cases delivering results that go beyond human capabilities. Automation and robotics also contribute to productivity. At a time of low productivity growth, this would provide the necessary stimulus for economic growth and prosperity in Slovak economy as well as it would also help offset the impact of declining working age population. To broaden this topic, the further research will continue with exploring the role of Industry 4.0 and its impact on tourism sector development within the world economy development particularly in the U.S. and EU economies.

Literature:

1. Bolotov, I., Tauser, J.: Dependence of Czech Exports on German GDP - A Structural Analysis. *Small States - Big Challenges: The Experience of the EU and Visegrad Region*, 2015, pp. 97-112
2. Boukalova, K., Kolarova, A., Lostak, M.: Tracing shift in Czech rural development paradigm (Reflections of Local Action Groups in the media). *Agricultural Economics-Zemedelska Ekonomika*, 2016. 62 (4), pp. 149-159. DOI: 10.17221/102/2015-AGRICECON
3. Cajka, R., Kral, P., Tauser, J.: International Scientific Conference: "Central and Eastern Europe in The Changing Business Environment". *Politicke Vedy*, 2015, 18 (3), pp. 278-281
4. Cernohlavkova, E., Machkova, H., Sterbova, L., Zadrazilova, D.: Foreign and Domestic Trade - The History and Development of Science Branch. *Politicka Ekonomie*, 2013, 61 (4), pp. 407-419. DOI: 10.18267/j.polek.916
5. Cihelkova, E., Nguyen, HP., Fabus, M., Cimova, K.: The EU Concept of the "Strategic Partnership": Identifying the "Unifying" Criteria for the Differentiation of Strategic Partners. *Entrepreneurship and Sustainability Issues*, 2020, 7 (3), pp. 1723-1740. DOI: 10.9770/jesi.2020.7.3(19)
6. Cihelkova, E., Nguyen, HP.: EU's and China's Approaches to Adapting Mutual Relations to New Global Conditions. *Proceedings of the 4th International Conference on European Integration 2018 (ICEI 2018), PTS 1-3 Book Series: International Conference on European Integration*, 2018, pp. 190-198.
7. Daňo, F., Lesáková, D.: The role of environmental stimuli in shopping evaluation and responses. *Ekonomicky Casopis*, 2018, 66 (5), pp. 465-478.
8. De Castro, T., Vlčková, J., Hnát, P.: Trade and investment relations between the Czech Republic and China: The Czech Republic as a gateway to the EU? *Society and Economy*, 2017, 39 (4), pp. 481-499. DOI: 10.1556/204.2017.39.4.2
9. Drabik, P., Zamecnik, P.: Key Aspects of Logistics for Online Store and Multi-channel Distribution. In: *Proceedings of 16th International Joint Conference: Central and Eastern Europe in the Changing Business Environment*, 2016. pp. 97-111.
10. Dudáš, T., Grančay, M.: Regional structure of foreign direct investment in Slovakia – a district-level gravity-type model 2009 – 2016. *Ekonomicky casopis*, 2019, 67 (8), s. 811-836.
11. EUROSTAT. 2020. [on line]. [cit. 2020-03-17]. Retrieved from: https://eurostat.sk
12. Fojtikova, L., Stanickova, M.: The EU member states export competitiveness and productivity, *Politicka Ekonomie*. 2017, 65 (6), pp. 669-689. DOI: 10.18267/j.polek.1169
13. Fojtikova, L.: China's Intellectual Property Rights Commitments in the WTO: Legal and Economic Implications. *China and WTO Review*, 2018, 4 (1), pp. 7-34. DOI: 10.14330/cwr.2018.4.1.01
14. Gärtner, M., Sadílek, T., Zadražilová, D.: Cross-cultural adaptability in a sample of international university students in Prague – gender and culture effect. *Journal of Applied Economic Sciences*, 2017, 12 (3), pp. 893-906.
15. Grmelova, N.: Awarding Damages for Health Impairment in Recent Case Law of the Court of Justice of the EU. *Proceedings of the 4th International Conference on European Integration 2018 (ICEI 2018)*, PTS 1-3 Book Series: International Conference on European Integration, 2018b, pp. 349-355.
16. Grmelova, N.: The CJEU Elaborates on The Concept of Consumers with Respect to International Jurisdiction for Class Actions. *Proceedings of the 16th International Conference Economic Policy in The European Union Member Countries*, 2018a, pp. 107-113.
17. Hanulakova, E., Dano, F., Drabik, P.: Approaches to Education in the Field of Management, Marketing and Environmental Consulting. *AD ALTA-Journal of Interdisciplinary Research*, 2019, 9 (1), pp. 84-91.
18. Hanulakova, E., Dano, F.: Circular Economy as a New Managerial Approach. *AD ALTA-Journal of Interdisciplinary Research*, 2018, 8 (1), pp. 95-98.
19. Harakaľova, L.: The Concept of Smart Villages (Smart Places) in EU Policies. In: *International Relations 2018: Current Issues of World Economy and Politics*, 2018, pp. 221-226.
20. Haviernikova, K., Klucka, J.: The Risks in the Case of Cluster Cooperation and Ways of their Prevention: As Seen by SMEs Entrepreneurs. *AD ALTA-Journal of Interdisciplinary Research*, 2019, 9 (1), pp. 114-119.
21. Haviernikova, K., Ivanova, E.: Evaluation of Selected Risk Categories Related to Marketing Activities by SMEs in Case of Potential Cluster Cooperation. *Proceedings of the Third International Conference on Economic and Business*

Management (FEBM 2018), Book Series: AEBMR-Advances in Economics Business and Management Research, 2018, vol. 56, pp. 433-436.
22. Helisek, M.: Perspectives of the Accession of the Czech Republic to the Euro Area in terms of the Price Level Convergence. *Economics & Sociology*, 2015, 8 (2), pp. 28-35. DOI: 10.14254/2071-789X.2015/8-2/3
23. Helisek, M.: The Risks Associated with The "Danish Scenario" for the Participation of the Czech Koruna in the ERM II. *Proceedings of the 16th International Conference Economic Policy in the European Union Member Countries*, 2018, pp. 139-149.
24. Hnat, P., Sankot, O.: European imbalances and shifts of global value chains to the Central European periphery: role of institutions. *AUC Geographica*, 2019, 54 (2), pp. 221-231. DOI: 10.14712/23361980.2019.19
25. Hnat, P., Stuchlikova, Z.: China-V4 Investment Relations - A Czech Perspective. *Current Trends and Perspectives in Development of China - V4 Trade and Investment*, 2014, pp. 61-81.
26. Hotels and Restaurants Association of Slovak Republic (ZHR SR). 2020. [on line]. [cit. 2020-03-17]. Retrieved from: https:// https://www.ahrs.sk/
27. IATA - International Air Transport Association. 2020. [online]. [cit. 2020-04-27]. Retrieved from: www.iata.org
28. ILO - International Labour Organization. 2020. [online]. [cit. 2020-04-28]. Retrieved from: https://www.ilo.org
29. Ivanová, E., Masárová, J.: Performance evaluation of the Visegrad Group countries. *Economic Research-Ekonomska Istrazivanja*, 2018, 31 (1), pp. 270-289.
30. Jašková, D.: Assessment of social development in Slovakia in the context of human resources. *Central European Journal of Labour Law and Personnel Management*, 2019, 2 (2), s. 21-32. DOI: 10.33382/cejllpm.2019.03.02
31. Jirankova, M., Hnat, P., Antal, J., Sankot, O.: Euro Area Imbalances - Macroeconomic Competitiveness as a Balancing Factor? In: *Small States - Big Challenges: The Experience of the EU and Visegrad Region*, 2015. pp. 9-25.
32. Jirankova, M., Hnat, P.: Balance of payments adjustment mechanisms in the Euro area. *Eastern Journal of European Studies*, 2012, 3 (1), pp. 67-86.
33. Jirankova, M.: Nation-States as Investors in a Globalized World. *Ekonomicky Casopis*, 2012, 60 (8), pp. 854-870.
34. Krajnakova, E., Vojtovic, S.: Struggles of Older Workers at the Labour Market. *Economics & Sociology*, 2017, 10 (1), pp. 319-333. DOI: 10.14254/2071-789X.2017/10-1/23
35. Krajnakova, E., Jegelaviciute, R., Navickas, V.: The Economic Factors Influence on Real Estate Market Development. *AD ALTA-Journal of Interdisciplinary Research*, 2018, 8 (2), pp. 141-146. .
36. Kreckova, Z. Zadrazilova, D. Rezankova, H.: The Added Value of Women in Management: The Czech Case. *Prague Economic Papers*, 2016, 25 (3), pp. 354-373. DOI: 10.18267/j.pep.588
37. Kreckova, Z., Odehnalova, J., Reardon, J.: Consumer Ethnocentricity within the Environment of Economic Crisis. *Inzinerine Ekonomika-Engineering Economics*, 2012, 23 (3), pp. 271-281. DOI: 10.5755/j01.ee.23.3.1932
38. Krnacova, P., Drabik, P.: Consumer Awareness about Electromobility. *Proceedings of 18th International Joint Conference: Central and Eastern Europe in the Changing Business Environment*, 2018. pp. 190-201.
39. Lipkova, L., Gress, M., Poncarova, A.: Tax systems in the Czech Republic and the Slovak Republic: Comparison with an emphasis on income tax. *Economic Annals-XXI*, 2017, 165, pp. 47–51. DOI:10.21003/ea.V165-10.
40. Lipkova, L., Hovorkova, K.: Economic situation in Norway after the outbreak of the global financial and oil crises in the context of EU integration trends. *Economic Annals-XXI*, 2018, 169, pp. 12–14.
41. Lipkova, L.: New Time in the Development of the Republic of Chinese. International Relations 2017: Current Issues of World Economy and Politics, 2017, pp. 684-691.
42. Machkova, H., Sato, A.: Analysis of Competitiveness of Belgian Sugar Industry. *Listy Cukrovarnicke a Reparske*, 2017, 133 (12), pp. 390-392.
43. Maitah, M. Smutka, L.: Development of World Sugar Prices. *Sugar Tech*, 2019, 21 (1), pp. 1-8. DOI: 10.1007/s12355-018-0618-y
44. Miklosik, A., Evans, N., Zak, S., Lipianska, J.: A framework for constructing optimisation models to increase the visibility of organizations' information in search engines. *Information Research-An International Electronic Journal*, 2019, 24 (1), Article Number: 808.
45. Miklosik, A., Kuchta, M., Evans, N., Zak, S.: Towards the Adoption of Machine Learning-Based Analytical Tools in Digital Marketing. *IEEE ACCESS*, 2019, vol. 7, pp. 85705-85718. DOI: 10.1109/ACCESS.2019.2924425
46. Miklosik, A., Kuchta, M., Zak, S.: Monetising Content Through Delivery of Advertisements: The Case of Ad Blockers. *Ad Alta-Journal of Interdisciplinary Research*, 2018, 8 (1), pp. 175-179.
47. Ministry of Economy of Slovak Republic. 2020. [on line]. [cit. 2020-03-17]. Retrieved from: https://economy.gov.sk
48. Mura, L., Havierniková, K., Machová, R.: Empirical results of entrepreneurs' network: Case study of Slovakia. *Serbian Journal of Management*, 2017, 12 (1), pp. 121-131.
49. Mura, L., Kljucnikov, A.: Small Businesses in Rural Tourism and Agrotourism: Study from Slovakia. *Economics & Sociology*, 2018, 11 (3), pp. 286-300.
50. Mura, L.: Entrepreneurship Internationalization - Case of Slovak Family Businesses. *AD ALTA-Journal of Interdisciplinary Research*, 2019, 9 (1), pp. 222-226.
51. Nenckova, L., Pecakova, I., Sauer, P.: Disposal behaviour of Czech consumers towards textile products. *Waste Management*, 2020, vol. 106, pp. 71-76. DOI: 10.1016/j.wasman.2020.03.001
52. Nevima, J., Tureckova, K., Varadzin, F.: The Role of Public Administration Bodies in Relation to the Unsuccessful Drawing Funds from the European Union in the Sphere of Education. *Proceedings of the 16th International Conference Economic Policy in the European Union Member Countries*, 2018, pp. 251-258.
53. OECD. 2020. [online]. [cit. 2020-01-23]. Retrieved from: https://www.oecd-ilibrary.org/employment/data/oecd-productivity-statistics/gdp-per-capita-and-productivity-levels_data-00686-en
54. Okreglicka, M., Haviernikova, K., Mynarzova, M., Lemanska-Majdzik, A.: Entrepreneurial Intention Creation of Students in Poland, Slovakia and Czechia. *Polish Journal of Management Studies*, 2017, 15 (2), pp. 162-172. DOI: 10.17512/pjms.2017.15.2.15
55. Sadilek, T., Zadrazilova, D.: Current Trends in German Sugar Industry. *Listy Cukrovarnicke a Reparske*, 2016. 132 (12), pp. 390-393.
56. Sadilek, T., Zadrazilova, D.: History and Nowadays Situation of Sugar Industry in Austria. *Listy Cukrovarnicke a Reparske*, 2015, 131 (12), 392-395.
57. Saroch, S. European crossroads. *Politicka Ekonomie*, 2015, 63 (5), pp. 677-680. DOI: 10.18267/j.polek.1019
58. Saroch, S., Famfule, J.: The Strengths and the Bottlenecks of the European Banking Union. *Proceedings of 14th International Scientific Conference: Economic Policy in the European Union Member Countries, PTS 1 and 2*, 2016, pp. 717-727.
59. Saroch, S., Smejkal, V.: Rethinking the EU Globalization Policies. *Proceedings of the 4th International Conference on European Integration 2018 (ICEI 2018), PTS 1-3, Book Series: International Conference on European Integration*, 2018, pp. 1457-1465
60. Sauer, P., Hadrabova, A., Kreuz, J.: Decoupling of GDP and air pollution in the Czech Republic: trend analysis and policy story behind. *International Journal of Environmental Technology and Management*, 2018, 21 (5-6), Special Issue: SI, pp. 253-272.
61. Sauer, P., Kolinsky, O., Prasek, J.: Negotiating Municipalities-Industrial Factory Wastewater Treatment Coalition Project: An Economic Laboratory Experiment. *Journal of Environmental Protection and Ecology*, 2019, 20 (1), pp. 369-375.
62. Sejkora, J., Sankot, O.: Comparative advantage, economic structure and growth: The case of Senegal. *South African*

Journal of Economic and Management Sciences, 2017, 20 (1), Article Number: a1685. DOI: 10.4102/sajems.v20i1.1685
63. Sejkora, J.: Poor Economics: A Radical Rethinking of the Way to Fight Global Poverty. *Ekonomicky Casopis*. 2014, 62 (4), pp. 431-435.
64. Simionescu, M., Bilan, Y., Streimikiene, D.: The Impact of Biodiesel Consumption by Transport on Economic Growth in the European Union. *Inzinerine Ekonomika-Engineering Economics*. 2019, 30 (1), pp. 50-58. DOI: 10.5755/j01.ee.30.1.21831
65. Slovak Statistical Office. 2020. [on-line]. [cit. 2020-04-27]. Retrieved from: http://datacube.statistics.sk; https://slovak.statistics.sk
66. Svarc, Z., Grmelova, N.: Consumer Protection in Common European Sales Law. In: *Proceedings of 12th International Scientific Conference: Economic Policy in the European Union Member Countries, PTS I and II*, 2015. pp. 820-828.
67. Tajtakova, M., Zak, S., Filo, P.: The Lipstick Effect and Outdoor Cultural Consumption in Slovakia in Times of Crisis. *Ekonomicky Casopis*, 2019, 67 (6), pp. 607-628.
68. Tauser, J., Zambersky, P., Cajka, R.: Comparative price levels of new EU member countries. *International Journal of Management and Economics*, 2013, 39 (1), pp. 9-17. DOI: 10.2478/ijme-2014-0018
69. Toth, D., Maitah, M., Maitah, K. (2019). Development and Forecast of Employment in Forestry in the Czech Republic. *Sustainability*, 2019, 11 (24), Article Number: 6901. DOI: 10.3390/su11246901
70. Tupa, M., Vojtovic, S.: Impact of Brexit on the Migration in the UK. *AD ALTA-Journal of Interdisciplinary Research*, 2018, 8 (2), pp: 306-309.
71. Varadzin, F.: Global Public Goods and Integration. In: *Proceedings of the 3rd International Conference on European Integration 2016 (ICEI 2016)*, 2016. pp. 1052-1059.
72. World Tourism Organization UNWTO. (2020): [online]. [cit. 2020-04-28]. Retrieved from: http://wtd.unwto.org/content/wtd-2018-tourism-digital-era
73. Zagata, L., Hrabak, J., Lostak, M.: Post-socialist transition as a driving force of the sustainable agriculture: a case study from the Czech Republic. *Agroecology and Sustainable Food Systems*, 2020, 44 (2), pp. 238-257. DOI: 10.1080/21683565.2019.1585400
74. Zagata, L., Lostak, M., Swain, N.: Family Farm Succession of the First Post-Socialist Generation in the Czech Republic. *Eastern European Countryside*, 2019, 25 (1), pp. 9-35. DOI: 10.12775/EEC.2019.001
75. Zemanova, S. Drulakova, R: Mainstreaming Global Sustainable Development Goals through the UN Global Compact: The Case of Visegrad Countries. *Journal of Risk and Financial Management*, 2020, 13 (3), Article Number: 41. DOI: 10.3390/jrfm13030041
76. Zemanova, S., Drulakova, R.: Making Global Goals Local Business in V4 Countries: V4 Entrepreneurs and the UN Global Compact. *Globalization and its Socio-Economic Consequences, 16th International Scientific Conference Proceedings, PTS I-V*, 2016. pp. 2490-2497.
77. Zemanova, S.: When could new 'potent small states' emerge? A study of the recent metamorphosis of Czech human rights foreign policy. *Journal of International Relations and Development*, 2015, 18 (2), pp. 129-154. DOI: 10.1057/jird.2013.16

Primary Paper Section: A

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